Project: *Animated Earth*

Last update: 30 September 2005

This report documents the project's objectives, deliverables, outcomes and ongoing progress. It also describes the project's plans for deployment, evaluation and continuation. This is a living document – it is modified and updated as the project progresses.

Project Objectives

1. Provide one-hundred (or more) internet-accessible animated visualizations of important Earth Science processes, events, and phenomena to students, educators and the public, using NASA remote sensing and model data.
2. Maintain a public server-side infrastructure to deliver these visualizations using the chosen standards and protocols.
3. Provide support for appreciation of educational content:
   3.1. Provide sufficient text descriptions to accurately identify animations. Include file size, time frame, specific location if relevant (versus planetary) and scientific content.
   3.2. Provide relevant keyword identifiers for animations. At a minimum this would include the primary Earth science category or geosphere, hydrosphere, atmosphere or biosphere with sufficient additional keywords to accurately define the animation (e.g., as listed by DLESE or other standardization organization including animations that address topics such as solar radiation [energy balance] recipe for a hurricane [natural disasters], on-demand or resizable content [technology, health]). Specific NASA satellite and that satellite's data collection tool would also be appropriate.
4. Identify another visualization tool (e.g., NASA Digital Earth) that uses Animated Earth data.
5. Utilize the NLT forum capability as an evaluation and feedback mechanism.

Customers

1. K-16 teachers, students, and the general public.
2. Software developers desiring to include the visualization capability in their applications.

Use Cases

1. An elementary school teacher displays on the classroom computer projector a collection of animated hurricane visualizations to illustrate the formation and behavior of powerful storms.
2. A geography, history, or anthropology teacher displays animations of the change in population or land-use over time.
3. Museums enable their visitors to interactively observe and discover patterns of current Earth events and phenomena.

People

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Partnerships

- Classroom of the Future (COTF)
- NASA Explorer Schools

Deliverables and Schedule

- 15 Nov 2004 – Annual performance plan complete
- 1 Jan 2005 – Forum established for user feedback
- 1 Feb 2005 – Educational content protocols defined
- 1 Feb 2005 – 1st 25 animations available
- 1 Apr 2005 – 2nd 25 animations available
- 1 Jun 2005 – 3rd 25 animations available
- 15 Aug 2005 – 4th 25 animations available

Dependencies

- Continuation and formation of the above partnerships.

Assumptions

Accomplishments

The project's accomplishments and deliveries are captured here:

1. 30 October 2004 – Annual Performance Plan delivered.
2. 15 Jan 2005 – Forum established for user feedback
3. 1 February 2005 – Additional project member hired.
4. 1 February 2005 – Educational content proposals still in development.
5. 1 March 2005 – 30 animations available.
6. 1 April 2005 – Education content to be identified via appropriate keywords chosen from the Global Change Master Database (GCMD) and Digital Library for Earth System Education (DLESE).
7. 29 June 2005 – 90 animations and 25 single images publicly available on the server.
8. 30 September 2005 – Project has completed all requirements and deliverables.

Deployment and Evaluation Planning

This section identifies how the project specifically addresses NASA's six Education Program Operating Principles. These principles are described in the NASA Learning Technologies Phase 2 Requirements Specification (a.k.a. the NLT Project General Requirements).

Customer Focus

In general, the community for undergraduate Earth Science education is interested in and has an appetite for specific Earth science content that can be used within standardized curricula. NASA clearly has such content, but simple technological conduits have been lacking for the discovery and delivery of this content. The Animated Earth project is prototyping a scalable system for Earth science content delivery, one that, like the World Wide Web, does not require centralized

servers or software support and one that allows other agencies, data providers, and commercial entities to participate without restriction.

Content

The Animated Earth Project is entirely directed at implementing a server-protocol-client structure that enables NASA Earth science content to be utilized within formal and informal educational venues. The Animated Earth Server is populated with visualizations of NASA data, and so provides a direct conduit from NASA scientific research and mission efforts to the educational community.

Pipeline

The Animated Earth structure is like the World Wide Web in that it is completely open to use by all segments of the community. Even though the target of the project is undergraduate education, it is also true that 1) the public can, through the use of freely-available client programs, access the material in the home, 2) more sophisticated research results can be included for use by college-level educators, and 3) commercial and public sector entities can use the material and the infrastructure for accessing geospatial information of all kinds. When taken together, these possibilities mean that the infrastructure could provide a recognizable conduit for many populations to be attracted to science and technology careers through access to this exciting information.

Diversity

The Animated Earth, as a delivery mechanism, does not target specific groups. However, to the degree that specific content can be identified that is relevant or interesting to such groups, such content can be categorized and served to target groups using this mechanism.

Evaluation

During the current project year, a forum will be established within the LTP web area for gathering specific feedback and comment from the users of Animated Earth data. To the degree possible, such feedback will be tabulated and the results reported as part of this project. In addition, the Classroom of the Future will evaluate this technology and content, in order to provide reliable information about its potential for student learning and for involving external technology developers.

Partnership & Sustainability

The sustainability of the Animated Earth technology is inherent in the intrinsic design of the protocols and their application. It is not envisioned that NASA will have one massive server for such information, but that data centers and research efforts will "buy into" the technology by establishing their own servers within which specific data sets can be maintained and provided long-term. Just as internet-based searches and catalogs currently provide robust access to information on the web, similar catalogs and searches could do the same for georeferenced data and images within these protocols. This project will continue to interact and report on specific partnerships, both internal and external, that relate to the provisioning on new data within these protocols and to new external users of the information.

Actions in Response to the NLT Annual Project Review

The FY2004 Review of Animated Earth identified "alignment with national science education standards" as the primary target for improvement in this project. This alignment would take several forms:

- Identification of the appropriate standard with which to align;
- Creation of new visual content targeted at specific topics within the standard;
- Documenting content based on relevant topics and grade levels in the standard;
- Identifying delivery mechanisms for standard-specific content and metadata.

During this year the Animated earth project will create a very large number of animations and visualization that cover the gamut of NASA's Earth Science efforts in remote sensing and modeling. Animations will be tagged with their category and described in a way appropriate for the layman. Specific descriptions and meta-tagging of this content for educational use will be performed at the program level.

Continuation Plan

The animation collection will remain publicly available for an indefinite period of time after FY 2005. During Q3 and Q4 2005, the Project Office will investigate the creation of a DVD-based product containing a collection of the animations and a simple viewer.